Topic: Nets/Volume/Surface area of cones

Question: Find square feet.

A round guard tower on a castle has a cone-shaped slate roof with a radius of 12 ft and a height (not a slant height) of 16 ft. How many square feet of slate are covering the roof? Answer to the nearest square foot.

Answer choices:

A 240 ft^2

B 406 ft^2

C 639 ft^2

D 754 ft^2

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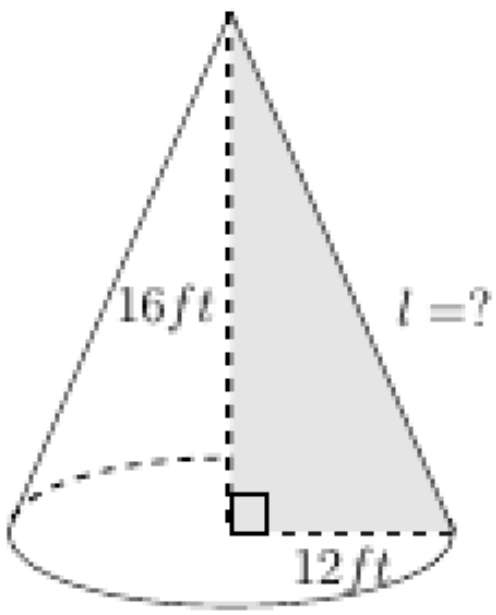
Solution: D

We need to first get the slant height using $a^2 + b^2 = c^2$.



$$(12)^2 + (16)^2 = l^2$$

$$144 + 256 = l^2$$

$$400 = l^2$$

$$l = 20$$

All we need for this problem is the lateral area of the cone.

The problem asks for an answer to the nearest square foot, so we will use 3.14 as an approximation of π.

$$L = \pi r l$$

$$L \approx 3.14 \cdot 12 \cdot 20$$

$$L \approx 754$$

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Topic: Nets/Volume/Surface area of cones

Question: Find the volume.

An ice cream cone has a diameter of 3 in and a height of 6 in. When it's filled level with the top, what volume of ice cream will it hold?

Answer choices:

A 4.5π in^3

B 9.25π in^3

C 13.5π in^3

D 37.5π in^3

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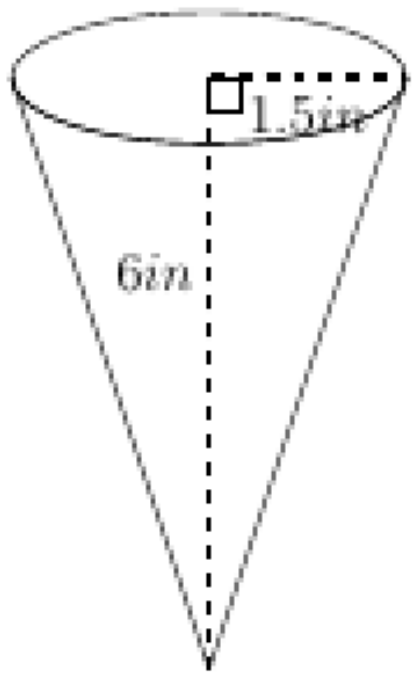
Solution: A

We need to use the formula for volume of a cone.

$$V = \frac{1}{3}\pi r^2 h$$

Then, plugging in the dimensions from the figure, we get



$$V = \frac{1}{3}\pi(1.5)^2(6)$$

$$V = 4.5\pi$$

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Topic: Nets/Volume/Surface area of cones

Question: Find surface area.

Two identical cones are glued together base-to-base to make a single double-cone solid. The diameter of the solid is 10 and its length is 24. What is the surface area to volume ratio of the solid?

Answer choices:

A $\frac{7}{10}$

B $\frac{5}{6}$

C $\frac{5}{12}$

D $\frac{13}{20}$

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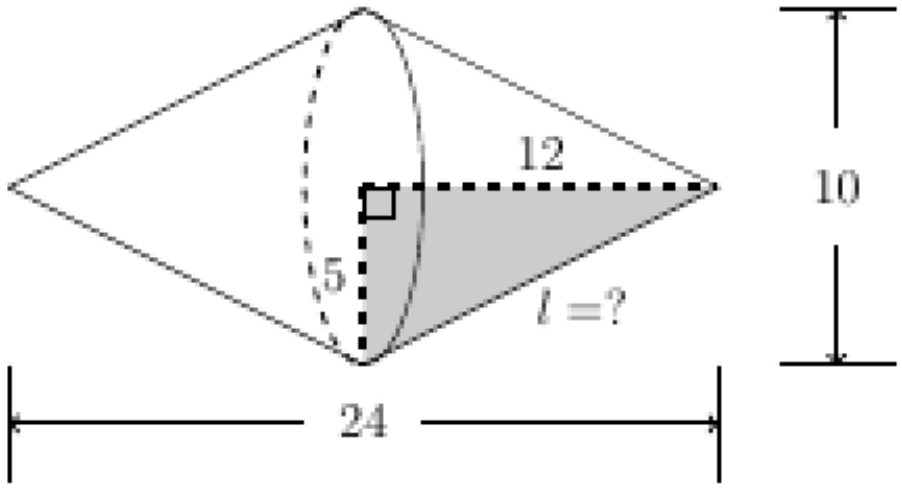
Solution: D

First, use $a^2 + b^2 = c^2$ to find l.



$$5^2 + 12^2 = l^2$$

$$169 = l^2$$

$$13 = l$$

Second, find the lateral area of one cone.

$$L = \pi rl = \pi(5)(13) = 65\pi$$

For the whole solid, $L = 2 \cdot 65\pi = 130\pi$. Third, find the volume of one cone.

$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}\pi(5)^2(12)$$

$$V = 100\pi$$

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And, for the whole solid $V = 200\pi$. Therefore, the surface area to volume ratio is

$$\frac{130\pi}{200\pi} = \frac{13}{20}$$

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